the Electrical Congress, held to celebrate the Volta centenary.

This was a no mere regal opening occupying a fraction of an hour, for a solid afternoon's work was done in receiving various addresses and listening to a long lecture on Volta and his pile, in which Volta's work was described at length, and even discussed from the modern standpoint of the ionic theory of voltaic action. Finally, the king had several foreigners presented to him, and he chatted with us about the things in which *we* were interested.

But even this was not enough for one day's work, since, before leaving, the Royal party went to the cathedral to listen to the new oratorio, *The Nativity*, which was exciting so much interest in Como at that time.

Such a keen personal interest in science and art made the king much loved by a people who venerate even the tomb of a worker like Volta. And those of us who saw King Umberto only at Como last year feel that it is not merely a king, but a friend who has now been killed.

W. E. AYRTON.

NOTES.

ON Monday next, August 6, the International Congress of Physics will be opened at Paris with an address by the president, Prof. Cornu. The Congress will then be divided into the seven following sections, which will meet in the rooms of the Société française de Physique: (1) general questions, instruction, measurements; (2) mechanical and molecular physics; (3) optics; (4) electricity and magnetism; (5) magneto-optics, radio-activity, discharges in gases; (6) cosmical physics; (7) biological physics. As many of our readers are aware, much attention has been given to the organisation of the Congress. The secretaries of the committee, Prof. Poincaré and Dr. Guillaume, have been entrusted with the production of three volumes, already in the press, containing more than seventy reports on physical questions of current interest and importance, contributed by physicists of various nationalities. Among the subjects dealt with by British physicists are: the movements produced in an indefinite solid by the displacement of a material body, by Lord Kelvin; the constant of gravitation, by Mr. C. V. Boys; the propagation of electricity, by Prof. Poynting; electric discharges in gases, by Prof. J. J. Thomson; properties of alloys, by Sir W. C. Roberts-Austen; and the unit of heat, by Mr. E. H. Griffiths. In addition there are contributions by Profs. Lorentz, van 't Hoff, Warburg, Voigt, van der Waals, H. Poincaré, Cornu, Lippmann, Potier, Becquerel, Arrhénius, Exner, Spring and others. The sectional meetings will partly be held simultaneously and partly at different hours, in order to give members an opportunity of hearing papers of interest to all physicists. In addition to the serious work of the Congress, provision has been made for lighter entertainment. The Municipal Council of Paris will hold a reception on Tuesday, August 7, and the French President will give a reception to the members on August 9. Prince Roland Bonaparte will give a soirée on August 11, and in his splendid library an exhibition of new apparatus and experiments will be held. There is thus every promise that the meeting will be both interesting and pleasant to all who are able to take part in it.

IT is announced that permission has been granted for the Institution of Electrical Engineers to hold a reception in the British Royal Pavilion in the Paris Exhibition from 5 to 7 p.m., on Wednesday, August 22, and that arrangements for the reception are being made accordingly.

WE learn from *Science* that the New York Board of Estimate and Apportionment has authorised the expenditure of 200,000 dollars for the Botanical Garden, and 150,000 dollars for an addition to the American Museum of Natural History.

MR. LEONARD S. LOAT, who is investigating the fishes of Egypt for the British Museum and the Egyptian Government, was last heard of at Korti, where he reports (on May 18) a hot wind and a temperature of 115° in the shade. He had sent home upwards of 2200 specimens of Nile-fishes to the Natural History Museum, and as soon as the river had risen sufficiently would proceed to Senaar and Khartoum.

MR. J. S. BUDGETT, who is engaged in collecting fishes on the River Gambia, dates his last letters (June 22) from McCarthy's Island in the interior. There had been a disturbance in the colony, and one of the Commissioners and a party of police were believed to have lost their lives; but this had not affected Mr. Budgett's operations, and he had a large number of Polypteri and Protopteri in floating cages in the river. He was in good health, and expected to be home again in September.

THE Rocky Mountain Goat (*Haploceros montanus*) in the Zoological Society's Gardens has now put on its full white summer dress, and is well worthy of inspection. This animal, until lately, was supposed to be the only representative of the Mountain or Goat-like Antelopes in the New World, but a second species of the same genus has recently been discovered in Alaska, and named by Mr. D. G. Elliott, of Chicago, *Oreamnus kennedyi*. The form is no doubt closely allied to *Nemorhaedus* of the mountain ranges of Asia, and probably found its way to the New World in company with the Rocky Mountain Sheep and Wapiti Deer.

THE *Electrician* states that the German Electro-Chemical Society is arranging to hold its seventh annual meeting at Zürich on August 5-7. In addition to the reading of a number of papers, visits are to be paid to the Polytechnic and to the works of the Oerlikon Co.

THE Moxon gold medal of the Royal College of Physicians, founded in 1886 in memory of the late Dr. Walter Moxon, and awarded every third year for distinction in clinical medicine, has been awarded to Sir William T. Gairdner, K.C.B., F.R.S., Emeritus professor of medicine in the University of Glasgow. Prof. Clifford Allbutt will deliver the Harveian Oration on October 18 (St. Luke's Day); and Dr. A. E. Garrod, the Bradshaw Lecture in November. Dr. Henry Head has been appointed the Goulstonian, Dr. J. Frank Payne the Lumleian, and Dr. Halliburton the Croonian Lecturer for 1901, and Dr. J. W. Washbourn the Croonian Lecturer for 1902.

WE are indebted to Mr. C. Repington, of Bridge End, Ockham, Surrey, for some eggs of the Wood Leopard Moth (*Zeuzera Æsculi*). They resemble strings of small oval beads, of a yellowish testaceous colour. The moth, although reputed scarce, is commoner round London than is generally supposed, and would be very destructive, if its numbers were not kept down by birds, notably by sparrows and woodpeckers. The eggs might be reared by placing them in chinks of the bark of almost any deciduous tree (apple, elm, &c.). The larvæ feed, like those of the Goat Moth (*Cossus ligniperda*), in the wood of growing trees, but are much less common.

QUESTIONS referring to the Marine Biological Association were asked in the House of Commons on Thursday last, and were replied to by Mr. Ritchie as follows:—"In 1885, the Treasury, when agreeing to a grant to the Plymouth laboratory of the Marine Biological Association, made it a condition 'That the council undertakes to place space in the Plymouth laboratory at the disposal of any competent investigator deputed by a recognised authority to carry out any investigation into fish questions for which the laboratory can give facilities.' The Board of Trade have never employed any naturalist to make investigations on fishes at the laboratory, and they have no staff or funds to devote to such a purpose. I have no information as

to what has been done by other Government authorities. The Board of Trade have occasionally consulted the council of the Marine Biological Association on fishery subjects. The latest occasion had reference to the question of a fisheries exhibit at the Paris Exhibition. The inspectors of the Board of Trade have on many occasions consulted the officials of the association in an informal manner. The association were not directly consulted by of the Board Trade as to the Bill dealing with undersized fish, which, however, was founded on the recommendations of the Select Committee of 1893, who took evidence from the association."

THE sixty-eighth annual meeting of the British Medical Association was opened at Ipswich on Tuesday under the Presidency of Dr. W. A. Elliston. An address in medicine was delivered on Wednesday by Dr. Philip Henry Pye-Smith, F.R.S.; an address in surgery will be delivered to-day by Dr. Frederick Treves; and an address in obstetrics will be delivered by Dr. William J. Smyly on Friday. The scientific business of the meeting is being conducted in thirteen sections, as follows, namely: Medicine; surgery; obstetrics and gynæcology; State medicine; psychology; physiology; pathology; ophthalmology; diseases of children; pharmacology and therapeutics; laryngology and otology; tropical diseases; navy, army and ambulance. The exhibits in the annual museum held in connection with the meeting are arranged in the following sections:—Section A: Food and drugs, including prepared foods, chemical and pharmaceutical preparations, &c.; Section B: Instruments, comprising medical and surgical instruments and appliances, electrical instruments, microscopes, &c.; Section C: Books, including diagrams, charts, &c.; Section D: Sanitary appliances and ambulances.

THE address of Mr. E. M. Holmes, the president of the British Pharmaceutical Conference held in London last week, and most of the papers read and discussed at the meetings, are published in full in the current number of the *Pharmaceutical Journal*. Mr. Holmes reviewed the progress of science, so far as it affected pharmacy, during the present century, and indicated some of the changes which have occurred. Referring to the subject of an international Pharmacopœia, he remarked:—"A General Pharmacopœia, that would enable a pharmacist to dispense a prescription with uniformity in any pharmacy on the Continent, may be regarded as a Utopian rather than a practical idea, and could only be attained by alphabetically arranging in dictionary form all the formulæ in all the known pharmacopœias. But there can be no reason why an approach towards it should not be made by a congress of medical men and pharmacists, limiting their attention, in the first place, to poisonous preparations only, and, in order to avoid international jealousies, adopting as a standard the formulæ that approach nearest to decimal proportions. The comparison of different formulæ is rendered a simple matter by the publication of the different strengths of preparations of the various pharmacopœias in Squire's 'Companion to the British Pharmacopœia.' The next step might be to make uniform the strength of the most generally used preparations that are not poisonous. A really useful International Pharmacopœia cannot be otherwise than a gradual growth."

AMONG the papers printed in the *Pharmaceutical Journal* are several of interest outside pharmaceutical circles. Mr. E. J. Parry shows that the so-called santalol, which exists to the extent of about 90 per cent. in sandal-wood oil, is a mixture of two or more bodies of an alcoholic nature, one of which is that to which the name santalene has been applied. Mr. T. H. Wardleworth deals with some pharmaceutical and economic plants of Jamaica. As the result of a visit to that island he is of opinion that pharmacists would do well to attempt to obtain from British colonies supplies of many drugs which at present come from other parts of the world. Messrs. T. Tyrer and A. Levy continue their investigation on melting points, the substances more recently examined being salicylic acid, salol, carbolic acid, menthol, and thymol. Messrs. C. T. Tyrer and A. Wertheimer have made a careful physical examination of American, Russian, and French turpentine oils and terebene made therefrom, and propose, at some future date, to investigate similar products from all possible sources. As a general rule they find that the higher the initial rotation of American turpentine the smaller is the product of inactive mixture capable of steam distillation and the higher the specific gravity. French turpentine has a greater tendency to oxidise than American, being intermediate between that and the Russian oil. Dr. F. B. Power summarises the methods which have been advocated for the preparation of mercurous iodide, and gives the results of determinations of the amount of iodine or pure mercurous iodide contained in specimens of the compound made in different ways. These results indicate that precipitated mercurous iodide is quite uniform in composition and also sufficiently stable when properly protected. Mr. E. Dowzard thinks that useful information may be obtained by determining the viscosity of essential oils. A specimen of pure lemon oil had a viscosity of 139·6, whilst that of citrene was found to be 105·8, and that of a mixture of citrene with 7·5 per cent. of citral was 114·9.

H.M.S. *Viper*, which it will be remembered is driven by the "Parsons' steam turbine system" (built by the patentees at their works at Newcastle for the British Government, and described and illustrated in NATURE of March 1), has this month not only broken her own record of 35½ knots, but proved to possess qualifications equally important in marine engineering. On six consecutive runs (says *Engineering*, July 20) the following speeds were attained:—

Time on measured mile	Equivalent speed in knots
m. s.	
1 38⅖	36·585
1 41⅖	35·503
1 37	37·113
1 38⅖	36·585
1 37	37·113
1 39⅘	36·072

The mean of two runs with and against the tide was 36·845 knots. The Admiralty mean of the six runs over the mile, with and against the tide, was 36·581 knots, which speed was also the mean for the hour's run. The mean revolutions for the hour's run was 1180 per minute. The steam pressure in the turbines ran up to 200 lbs. per square inch, and the mean pressure in the stokeholds was 4½ inches. Another important feature of the trials was that the *Viper* worked up from a speed of 14 knots to 36·585 knots in twenty minutes; almost as much importance is attached to this as to the high speeds attained, both being very valuable considerations in war vessels and cross channel boats. The trials, it is stated, worked without a hitch, and vibration was practically imperceptible in any part of the vessel.

ACCORDING to a writer in the *Times*, several earthquake shocks were felt at Bognor on July 18, between 10 and 11 p.m. Another correspondent suggests that they were merely the reports of the naval salute fired at Cherbourg on the departure of the French President at the times mentioned. The character of the disturbances, as described, certainly bears out this view. Similar movements and rumbling sounds were also observed at Torquay at the same time. Bognor is eighty-nine miles, and Torquay 101 miles, from Cherbourg.

THE Faculty of Sciences of the University of Rome proposes to publish by subscription a complete collection of the works of the late Prof. Eugenio Beltrami. The collection will probably extend to three or four large volumes of 2000 pages in all, and a copy will be sent to subscribers of 2*l.* and upwards. Subscriptions are to be sent to Isaia Sonzogno, secretary of the Scuola d'Applicazione per gli Ingegneri, 5, Piazza San Pietro in Vincoli, Rome.

IN a pamphlet, entitled the "Inidikil System," Mr. A. Lincoln Hyde suggests a decimal system of weights and measures for the English speaking people based on taking the inch as the fundamental unit. One of the author's main arguments for the proposal appears to be the failure of the metric system to obtain public favour in Great Britain and America, and he therefore thinks it desirable to make another attempt at decimalising our weights and measures.

IN the *Proceedings* of the Rochester Academy of Sciences, vol. iii. Brochure 2, Prof. Arthur L. Baker gives a general summary of vector analysis, and a short note on the graphic representation of imaginaries—both suitable for teaching purposes.

PART 13 of the *Rendiconti del R. Istituto Lombardo* contains two mathematical papers—one by Dr. Duilio Gigli, on helicoidal and ruled surfaces in elliptic space; the other by Signor U. Amaldi, on commutative linear substitutions. In the former, Dr. Gigli, starting with the classical methods of Beltrami, deduces certain theorems relating to ruled surfaces in space of constant curvature, exactly analogous to those known to exist in Euclidean space. The second paper deals with certain generalisations enunciated by Schlesinger in his note, "Ueber vertauschbare lineare Substitutionen" (Crelle, 1899), to which Amaldi applies certain synthetic methods due to Prof. Pincherle.

IN connection with the view that phosphorescence is due to movements of the ether determined by the vibrations of material particles, much interest attaches to the question as to whether the intensity of phosphorescence is modified by a magnetic field. Some experiments described by M. Alexandre de Hemptinne in the *Bulletin de la Classe des Sciences* (Brussels) appear to answer this question in the negative. In one experiment the phosphorescent substance was contained in a tube about 30 cm. long, placed between the poles of an electromagnet. The middle part of the tube was thus submitted to a field of about 30,000 C.G.S. units, while at the ends the magnetic force was comparatively feeble. The tube contained sulphide of calcium or of zinc, prepared after Becquerel's methods, and it was excited by being exposed to the sun. On observing the tube in a dark room it was seen to be uniformly phosphorescent throughout its length; it remained phosphorescent for a considerable time, and gradually the intensity diminished, but at no stage of the experiment was any difference of intensity noticeable from one end of the tube to the other. In order to make more exact observations, M. de Hemptinne constructed a phosphoroscope of sufficiently large dimensions to contain an electro-magnet. Although this method was much more sensitive than the preceding one, not the slightest difference could be observed in the behaviour of sulphide of lime, sulphide of zinc, nitrate of uranium, diamond and other more or less phosphorescent substances when submitted to a magnetic field of about 32,000 units.

HIGH summer temperatures have continued to prevail over the southern portion of our islands, but there has been an absence of the excessive heat which was experienced in the preceding week. Heavy thunderstorms occurred over a large part of England on July 27, resulting in a fairly heavy rain over London and smaller amounts in many parts of the country. Two quite separate storms passed over the metropolis, one in the afternoon and the second late in the evening. The lightning flashes were very frequent and unusually brilliant. At Greenwich, the rainfall accompanying the thunderstorms measured 0·84 inch, while in Westminster it only amounted to 0·42 inch. The weather has been generally cooler since the storms, although the thermometer in the south of England is well above the average. The mean temperature for July was 4° above the average at Greenwich; the mean of the maxima was 78°, and of the minima, or night readings, 57°. The total rainfall for the month at Greenwich was 1·41 inches, which is more than an inch less than the average.

A PAMPHLET on the organisation of the meteorological service in Japan has been published by the Tokio Observatory, for presentation to the Paris Exhibition. This service, which is very complete, consists of eighty stations of the first and second orders, and of about 900 stations at which only rainfall or temperature is recorded. The departmental stations, in accordance with the decree establishing the service, are established in suitable places, chosen by the Ministry of Public Instruction, and any persons wishing to establish additional stations have to obtain the authority of that Ministry. Electrical, earthquake, and other exceptional phenomena are regularly observed, in addition to the usual meteorological observations. All vessels belonging either to the imperial or merchant service, which are over 100 tons burden, are compelled to make observations at regular intervals, six times daily, and the logs are forwarded to the central observatory. There is also a regular service of weather telegraphy and storm warnings. The observations made three times daily are published in *Weather Reports*, together with forecasts for the following day. The average success of these forecasts amounts to 82 per cent., and of the storm warnings to 70 per cent. In addition to the *Daily Weather Report*, monthly and yearly bulletins are issued; these are naturally written in the Japanese language, but an English translation of the titles and important phrases is added. The present director of the service is Prof. K. Nakamura, graduate of the Tokio University; the staff and attendants of the central observatory amount to fifty-three in number.

THE ethnology of ancient history, deduced from records, monuments and coins, is a subject in which M. Charles de Ujfalvy has made some important investigations. In *l'Anthropologie*, tome ix., he has published a memoir on the White Huns. The Huns artificially deformed their heads so as to greatly increase their height (*déformation relevée* of Broca). They were nearly related to the Hoa of the Chinese annals (which name is merely the origin of the word Hun), to the Yé-tha of the Chinese (who must not be confounded with the very different Yué-tchi), and to the White Huns or Ephthalites of Byzantine and Armenian authors. The Hûna kings of India practised the same cranial deformation, as is shown by their effigies represented on their coinage. The Ephthalites practised polyandric customs, and their women wore special horned head dresses. Traces of polyandric habits, as well as of these extraordinary coiffures, are still to be met with, after more than twelve hundred years, in certain regions of the old Ephthalitic empire.

THE second part of vol. xxviii. of the *Morphologisches Jahrbuch* is entirely taken up by two profusely illustrated memoirs on the morphological anatomy of Vertebrates. In the first of these Dr. S. Paulli continues his elaborate investigations into the extent and form of the air-chambers in the mammalian skull; dealing in this section with the morphology of the ethmoid bone and the relations of the aforesaid chambers in Ungulates. Perhaps the most striking feature in this communication is the labour expended in working out the details of the labyrinth

formed by the ethmoid and surrounding structures, as is well displayed in the text-figures, which resemble puzzles of an unusually complex type. Very unexpected is the discovery that the structure of the ethmoid divides the more typical Ungulates into two groups, one represented by the Ruminants and the other by the Suina and the Perissodactyla. As this grouping so completely traverses the classification indicated by other parts of the organisation, it may be that the feature in question is purely adaptive. In the general structure of the ethmoid the elephant resembles more typical Ungulates. The second of the above-mentioned memoirs is a continuation of Dr. B. Haller's study of the Vertebrate brain; the present section dealing with the Pond-Tortoise (*Emys orbicularis*). At the conclusion of his paper the author refers to the structural resemblances between the reptilian brain on the one hand and that of Monotremes and Marsupials on the other. He is led to conclude that a commissure connecting the hemispheres of the brain was developed in an extinct forerunner of the reptiles, which formed the ancestral type of both the Sauropsida and the Mammalia.

TWENTY years ago the late Dr. Dobson described a new species of Australian bat, remarkable for its white head and lower surface of the body, under the name of *Megaderma gigas*. From that time to this the species has been known solely by the type specimen—a male. In No. 7, vol. iii. of the *Records* of the Australian Museum, Mr. E. R Waite describes a second example, this time a female, obtained in West Australia. To the same journal Mr. Waite likewise contributes a paper on additions to the fish-fauna of Lord Howe Island, in the course of which he describes four new species, one of them being assigned to a new genus. Several of them belong to the coral-eating Chætodonts. The author draws attention to the circumstance that since the transparent larval form to which the name Leptocephalus was assigned in 1763 is now ascertained to be the young of the Conger-eel, the generic title Conger has to give place to Leptocephalus. As this latter name is now no longer available for other similar larvæ of which the adults are unknown, he adopts for them the name Atopoichthys, lately proposed by Garman.

THE July number of the *Biologische Centralblatt* contains an interesting note by Dr. R. Stölzle on the position taken by K. E. von Baer with regard to the origin of the human race. Reference is made to von Baer's opposition to the doctrine of descent from lower animals (1) in pre-Darwinian times; (2) after the appearance of "The Origin of Species"; and (3) after the publication of "The Descent of Man."

CAPTAIN R. H. ELLIOTT, who has been for some time conducting researches into the nature and action of snake venom in India, arrives at the following conclusions in the *British Medical Journal*:—(1) The snakemen of South India are certainly ignorant of any method of producing in themselves a highly-developed condition of immunity. (2) Some few of them appear to practise the swallowing of venom, or the inunction of venom into their limbs, but it is doubtful if they do so with any well-defined object. It is possible that they thus obtain some degree of immunisation. (3) They confine themselves almost exclusively to the cobra, and escape harm by their intimate knowledge of the methods of handling this snake.

A COPY of the second edition of a catalogue of the fossils in the students' stratigraphical series of the Woodwardian Museum, Cambridge, by Mr. H. Woods, has been received.

THE plants collected on the Antillean cruise of the yacht *Utowana*, in Bermuda, Porto Rico, the Caymans, Cozumel, Yucatan, and the Alacran shoals, between December 1898 and March 1899, are described, under the title *Plantae Utowanae*, by Dr. Charles Frederick Millspaugh, in vol. ii. No. 1 of the botanical series of the Field Columbian Museum.

PROF. W. H. CORFIELD'S two Harveian lectures on disease and defective house sanitation have been translated into Hungarian by Dr. Frank, of Budapest, for the Royal Society of Public Health of Hungary. Dr. Frank remarks in the preface that the lectures "merit the attention of Hungarian readers because they explain the views of a prominent English hygienist, and also because the sanitary arrangements of dwellings in Hungary are much more unsatisfactory than those in England."

THE additions to the Zoological Society's Gardens during the past week include a White-fronted Capuchin (*Cebus hypoleucus*) from Central America, presented by Mr. W. H. Laws; a Two-spotted Paradoxure (*Naudinia binotata*) from West Africa, presented by Mr. Robert H. Gush; a Levaillant's Amazon (*Chrysotis levaillanti*) from Mexico, four Lorikeets (*Trichoglossus rubritorques*) from North-west Australia, six Roofed Terrapins (*Kachuga tectum*) from British India, two Alligator Terrapins (*Chelydra serpentina*), an American Box Tortoise (*Cistudo carolina*), a Sculptured Terrapin (*Clemmys insculpta*) from North America, deposited; two —— Buntings (*Emberiza sulphurata*) from Japan, purchased; an Altai Deer (*Cervus eustephanus*), three Crested Pigeons (*Ocyphaps lophotes*), a Spotted Pigeon (*Columba maculosa*), four Vinaceous Turtle Doves (*Turtur vinaceus*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET BORRELLY BROOKS, 1900 *b*.—Several telegrams received from the *Centralstelle* at Kiel announce the appearance of a new comet in the constellation Aries. The following are the positions given:—

1900	R. A. h. m. s.	Decl.	Observer.
July 23d. 12h. 50·0m. (Marseilles Mean Time)	2 43 33	+11° 51′	Borrelly.
July 23d. 13·00h. (Geneva Mean Time)	2 43 40	+12° 30′	Brooks.
July 24d. 12h. 57·1m. (Strassburg Mean Time)	2 44 26	+14° 32′ 42″	Kobold.

A later circular from Kiel furnishes an ephemeris for further observations of the comet, prepared by Herr J. Möller from measures of July 24, 25 and 26.

Elements.

T = 1900 Aug. 3, 298. Berlin Mean Time.

ω = 12° 30·2
Ω = 328 1·8 } 1900·0.
ι = 62 35·6
log q = 0·00636

Ephemeris for 12h. Berlin Mean Time.

1900.	R.A. h. m. s.	Decl.	Br
Aug. 1	2 53 52	+38° 31·5	1·12
3	2 57 12	44 37·1	1·10
5	3 1 8	50 29·1	1·08
7	3 5 55	56 2·1	1·05
9	3 11 45	+61 11·9	0·91

CATALOGUE OF DOUBLE STARS.—The *first* volume (1900) of the *Publications of the Yerkes Observatory* of the University of Chicago has recently been distributed; it contains a list of 1290 double stars, discovered from 1871–1899 by Prof. S. W. Burnham, now on the staff of the Yerkes Observatory. The majority of the measures have hitherto only been published in sections, comprising portions of nineteen different catalogues, and the work of bringing so large a mass of material together was commenced during the author's connection with the Lick Observatory (1888–1892). While working with the large instrument there, many of the more difficult pairs were re-measured, and their positions carefully re-determined by comparison with the newer star catalogues of the *Astronomischen Gesellschaft*, Cordoba, &c., instead of those of Lalande and Argelander. As, however, in the present work no attempt has been made to supersede other star catalogues with respect to the absolute positions, it has not